Missouri Department of
Natural Resources

Drought Assessment Committee

May 4, 2006
Bennett Spring Conference Room
1738 E. Elm St.
Jefferson City MO

Attendees: Mike Wells, DNR, Steve McIntosh, DNR, Clark Thomas, USDA, Michelle Motley, USDA, Gerald Hrdina, USDA, Larry Archer, DNR, Shane Barks, USGS, Judy Grundler, MDA, Mark Matthews, EPA, Scott Dummer, NWS, Greg Weeks, MO American Water, David Hooven, COE, Bob Bailey, SEMA, Sarah Fast, DNR, Steve Wilson, MDC, Deana Cash, DNR, Stan Mason, Southwestern Power Administration, Sherry Chen, DNR, Joe Engeln, DNR, Steve Spaulding, Corps of Engineers, Warren Witt, Ameren-Osage Plant, Pat Guinan, UMC, Gene Danekas, USDA, Greg Carrell, Division of Fire Safety, Kelly Smith, MO Farm Bureau and Andy Papen, DED.

Mike Wells, DAC Chairman opened the meeting by welcoming all in attendance. Mike asked everyone to introduce himself or herself and identify the agency or company they represented. Mike Wells opened the meeting, welcoming all in attendance. Everyone introduced themselves and the agency they represented. Mike stated that drought conditions have changed since the scheduling of this meeting and conditions continue to change.

Warren Witt – Ameren
Previously met with Mike and others regarding the drought and the functions of the Drought Assessment Committee. At that time we also expressed our drought concerns and how they relate to Lake of the Ozarks. At the Lake our main business is to generate power. We also have concerns over the recreation industry on the Lake.

When lake levels are low docks sit on dry land. Fisherman cannot launch their boats if ramps are out of water and this hurts the recreation and fishing industry. Our plant talks with the National Weather Service everyday regarding lake level controls. The Lake was not built for flood control, but does help with flood control of the Osage River. In January the lake was full then went down in mid February to about 654ft. We run at full pool all summer and in the fall bring the level down to provide for fall flood protection, and then increase levels again in the winter. The Lake can also provide some water for the Missouri River to protect power plants if there is an ice jam on the Missouri River. Anything above 660ft is flooding for the Lake.

Truman Reservoir upstream from Lake of the Ozarks is also releasing and capable of producing hydropower. It is now 2 feet above conservation storage. Truman Reservoir has only 2 feet of conservation storage available before the flood control pool is reached. The Lake of the Ozarks is in much better shape than in April when water levels were 2 feet below the guide curve. Since the end of April Lake of the Ozarks has gained 2 feet and is now on their seasonal guide curve allowing them to produce hydropower. Fort Stockton Reservoir is still the lowest lake in the region and has not gone up as much, + 1.5 feet.

LAKE OF THE OZARKS CONCERNS

- Power Generation
  Not just a profit issue
  Osage Plant important for grid stability
  Other hydro plants in the state have similar issues
- Recreation Industry
  Industry continues to grow
  $207 million economic impact potential
  5700 jobs related to tourism
  Fishing industry in spring
  Boating all summer (season extending)

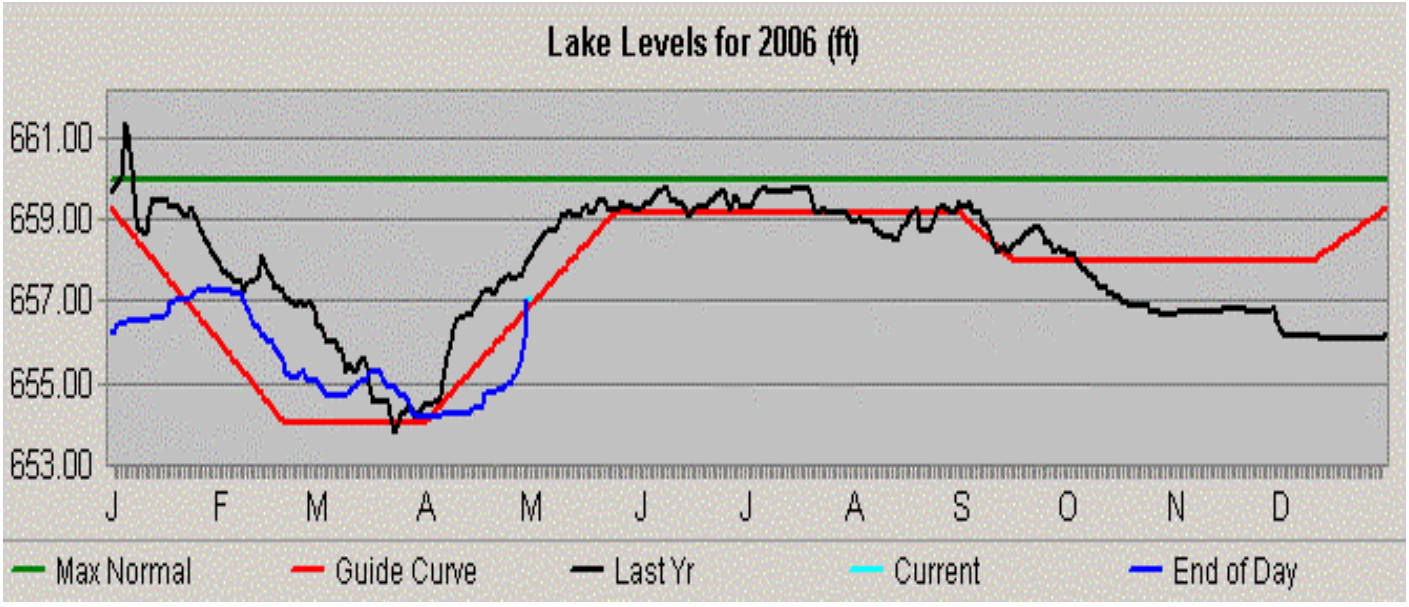
Not able to launch boats from ramps and docks

Month	Year	Precipitation Normal	Precipitation Actual	Inflow Normal Budget	Inflow Actual	Generation Normal Budget	Generation Actual
October	2005	3.58	0.84	228,000	38,900	38,000	9,738
November	2005	3.75	2.98	216,000	17,700	36,000	2,278
December	2005	3.16	0.31	222,000	17,900	37,000	2,989
January	2006	1.79	1.27	288,000	44,900	48,000	1,978
February	2006	2.17	0.03	252,000	30,200	42,000	11,480
March	2006	3.89	2.82	384,000	36,500	64,000	8,906
April	2006	4.18	0.16	420,000	13,000	70,000	706

Normal year to date precipitation 10 inches Six months normal is 22.52
Current year to date 4.28 inches Six months actual is 8.41

Lake Level Controls

- Ameren follows a guide curve
- Lower level in late winter to prepare for spring rains/floods
- Near full pool all summer for recreation and reserve power
- Guide curve allows some variance based on weather projections, power demand, etc.



Steve Spaulding – Kansas City District, Corps of Engineers

Concern Alleviated

- Rains on April 28-30 have alleviated our concerns for now
- Lake of the Ozarks will be full by Memorial Day
- Continued drought conditions through summer could cause concerns later on

Steve Spaulding – Corps of Engineers, Kansas City District

Inflows to our lakes have been much lower than normal since last summer, but at most of the Corps lakes in Missouri that is not a big problem. Most can withstand multiyear droughts and still have enough carryover water for most purposes, including water supply. Our Corps lakes are relatively large compared to municipal and farm lakes because of the design needs for flood control and long term conservation purposes. Stockton Lake was affected more than most of the Missouri Corps lakes because of the seasonal drawdown needed for power production.

After the few months of drought experienced so far, most of the lakes will recover with just 10 percent to 20 percent of normal inflow. The rains the last 2 weeks have gone a long way toward returning the lakes to normal pool levels. And in fact, among our District's lakes, only Long Branch Lake in northern Missouri and Stockton Lake in the Osage River basin have not fully returned to or risen above their normal pool elevations. Even at Long Branch and Stockton lakes, the recent rainfall has served to moisten up the soil, and rainfall events expected in the next month or so will likely bring the lakes back to their normal pool levels. To refill completely, Stockton needs about 3 inches of runoff from across the basin, which translates to 6-9 inches of rainfall over the next couple months. There has only been one year, 1977, in the last 40 years when it did not refill, so we are certainly hopeful that it will refill by this summer.

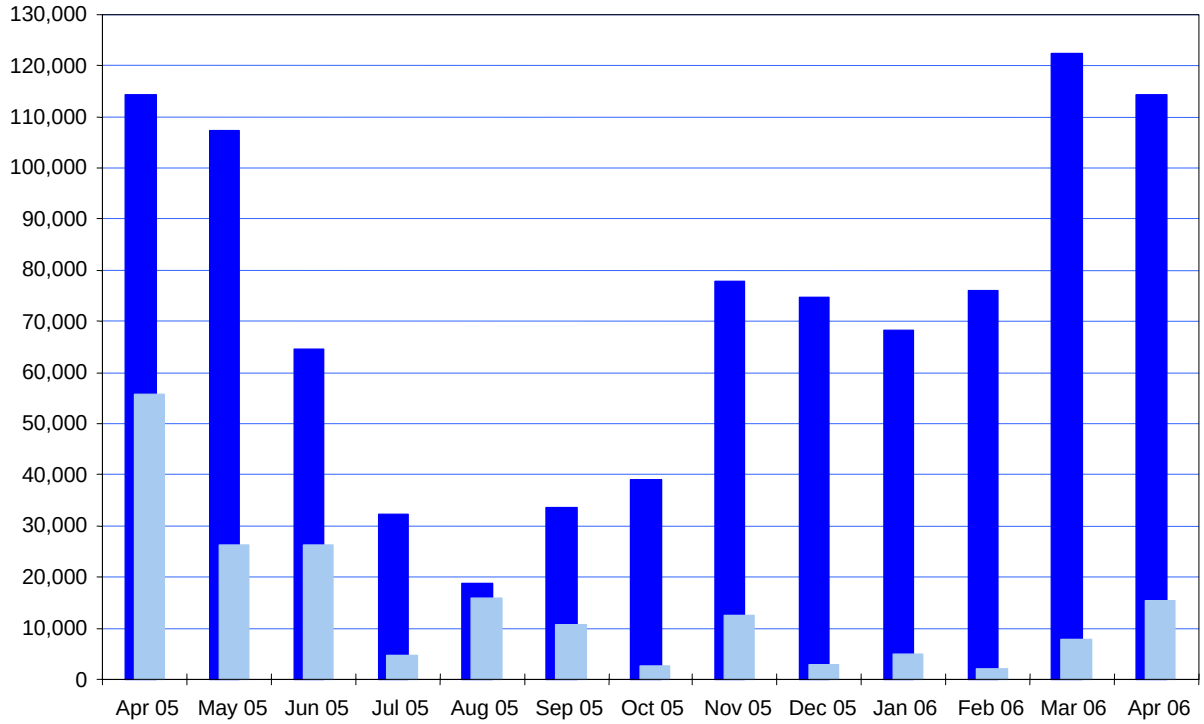
A number of municipalities, including Springfield, have water supply contracts at our lakes in Missouri. The contract holders have been using some of their allocations during this drought, but much more water is available at all of the lakes if needed. In a serious and long term drought situation, the Missouri state emergency office planners are aware of special authorities available to the Corps of Engineers allowing them to make additional water available to local farmers and municipal operators. Southwest Power Administration, the government agency charged with selling the power produced from Stockton and Truman lakes, has probably been affected more than any of the users of our lakes by the drought situation. Their revenue is directly proportional to the inflows to the lakes, up to the powerhouse capacities. And with the low inflows across all of the Midwest, their revenue is down substantially. But they also have authority to buy power to provide to their customers. They do not want to use up all of the available water in storage in the first year of a drought. With this rain the last couple of weeks, many of their power lakes, like Truman, have risen substantially. Since they try to keep all of their power lakes in balance as far as drawdowns, they do not have any need in the next month or so to generate power from Stockton.

Although drought conditions for the farmers have greatly improved with these recent rains, there is a lag in the recovery of base flows in the rivers due to the antecedent dry conditions. Your committee has correctly pointed out that hydrologic drought remains a concern in Missouri and we need a lot more rain before the rivers will get back to normal long-term flow levels.

Kansas City District, Corps of Engineers
Osage River Basin Lake Projects

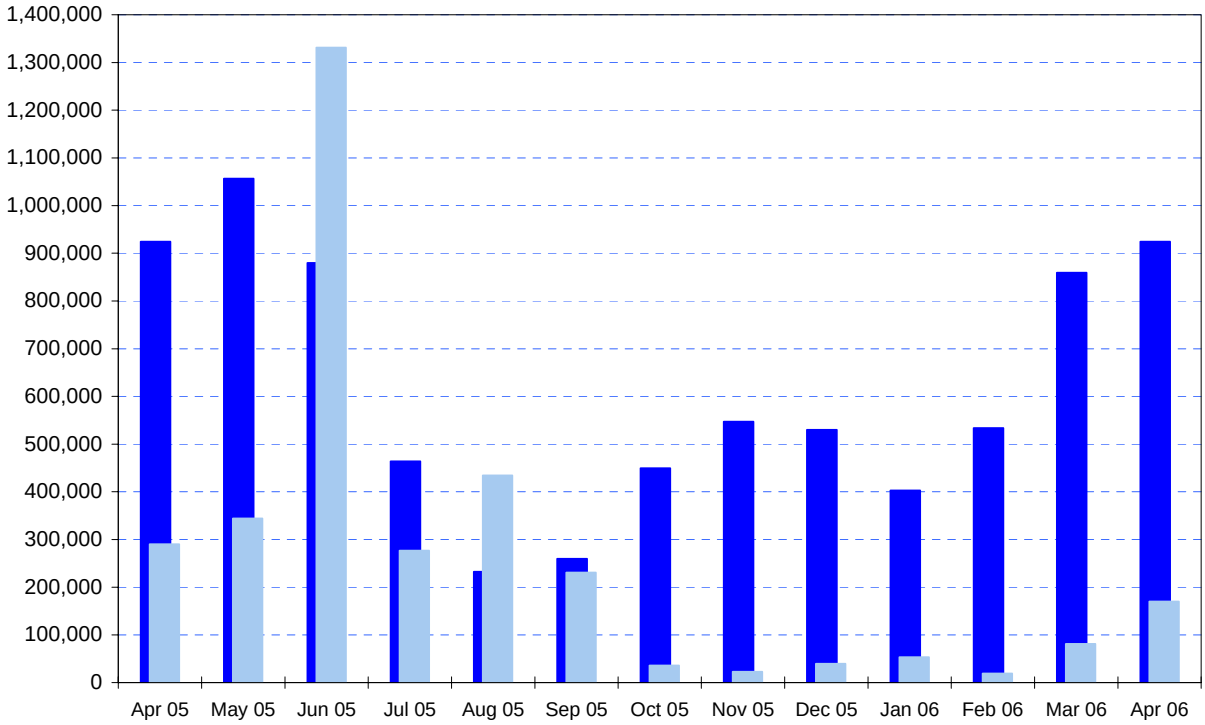
2005 - 06 Stockton Lake Monthly Inflows (AF)

Historic Average - Dark Bars **Actual - Light Bars**



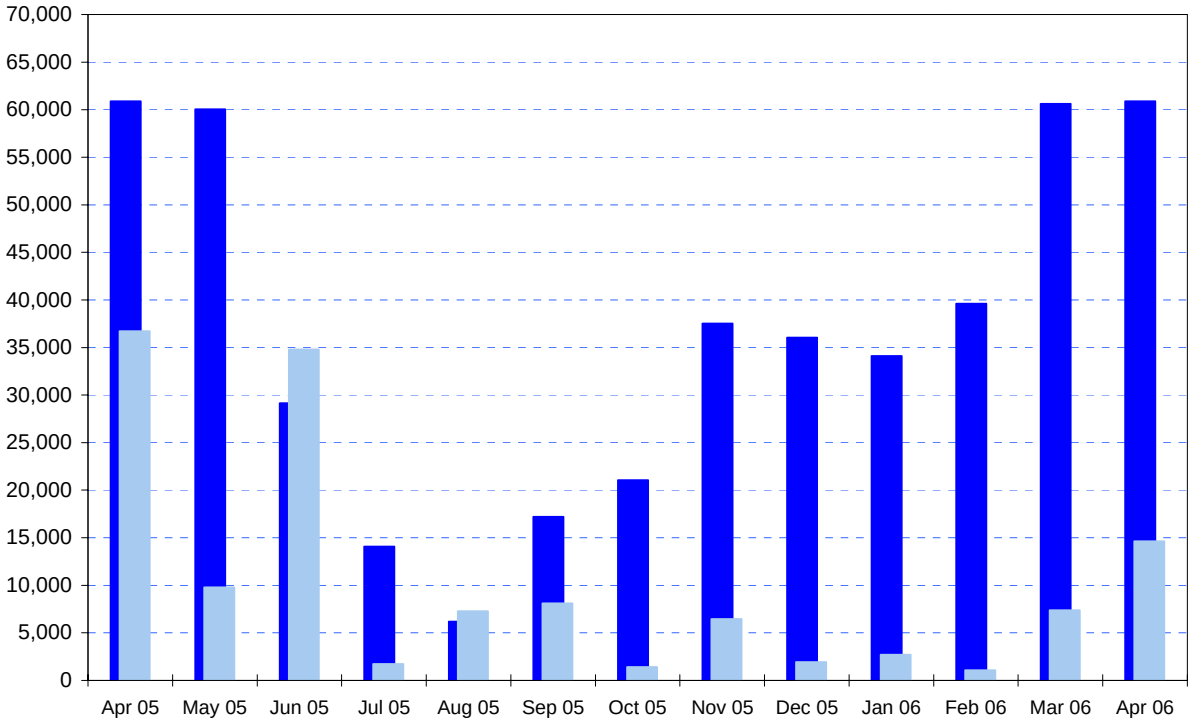
2005 - 06 Truman Reservoir Monthly Inflows (AF)

Historic Average - Dark Bars **Actual - Light Bars**



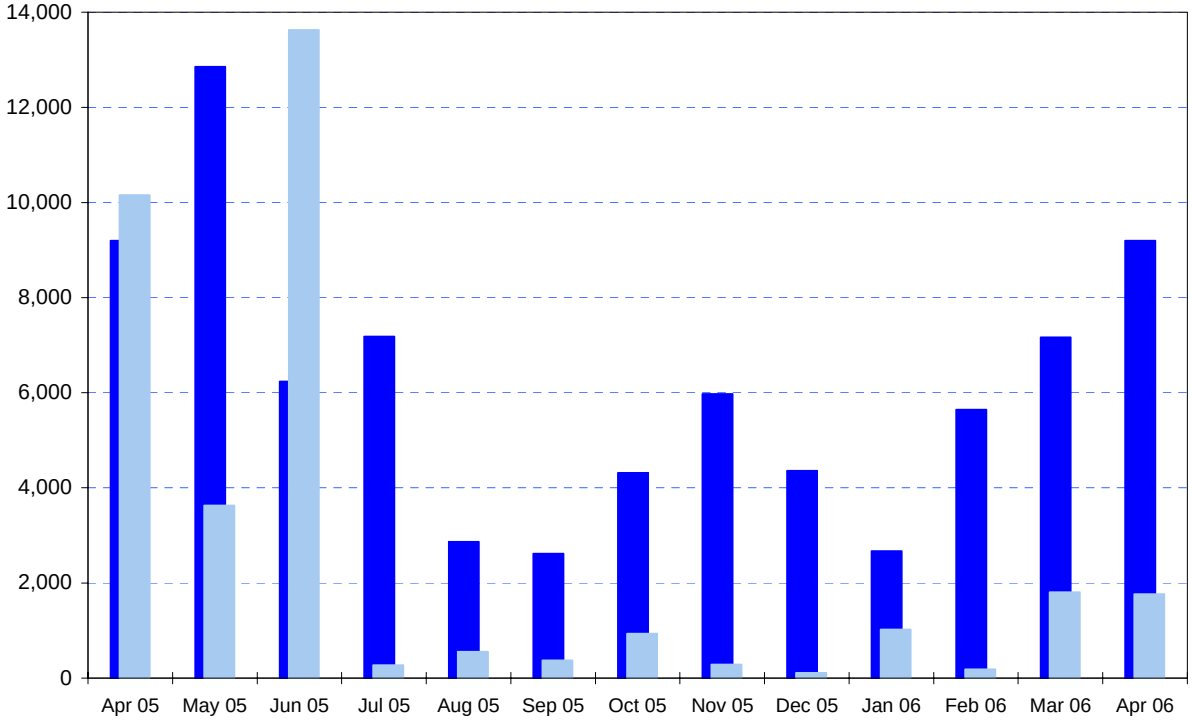
2005-06 Pomme de Terre Lake Monthly Inflows (AF)

Historic Average - Dark Bars **Actual - Light Bars**



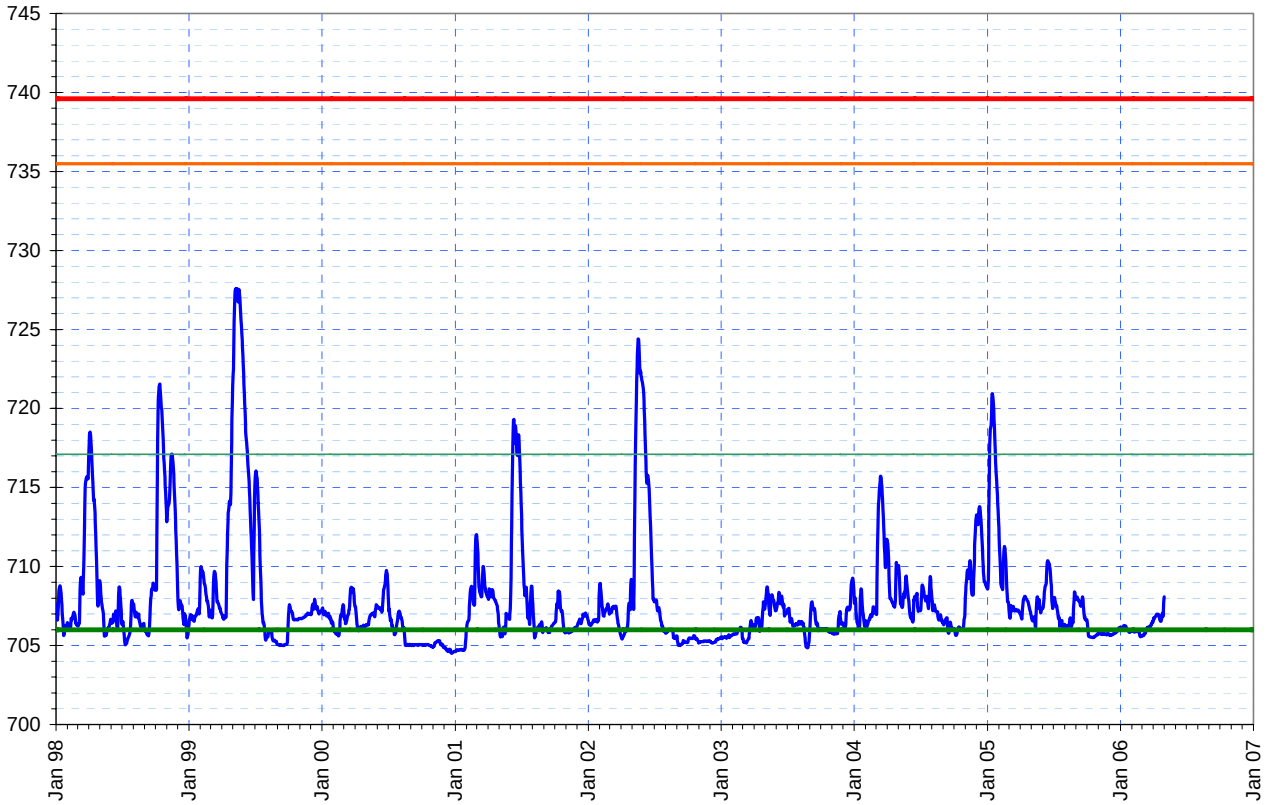
2005 - 06 Long Branch Lake Monthly Inflows (AF)

Historic Average - Dark Bars **Actual - Light Bars**



Truman Lake Historic (Actual) Pool Elevation

Normal Pool = 706.0 Ph 2 Elev = 717.1 Ph 3 Elev = 735.5 Top, Flood Pool = 739.6



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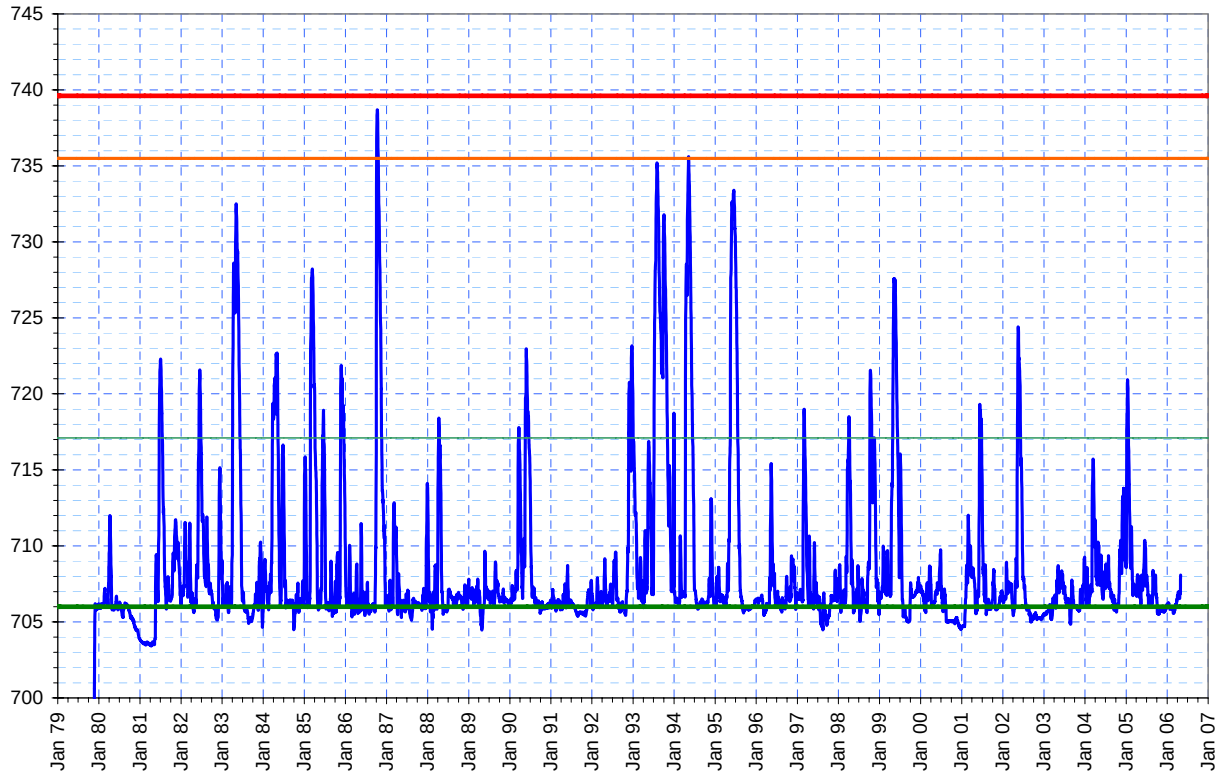
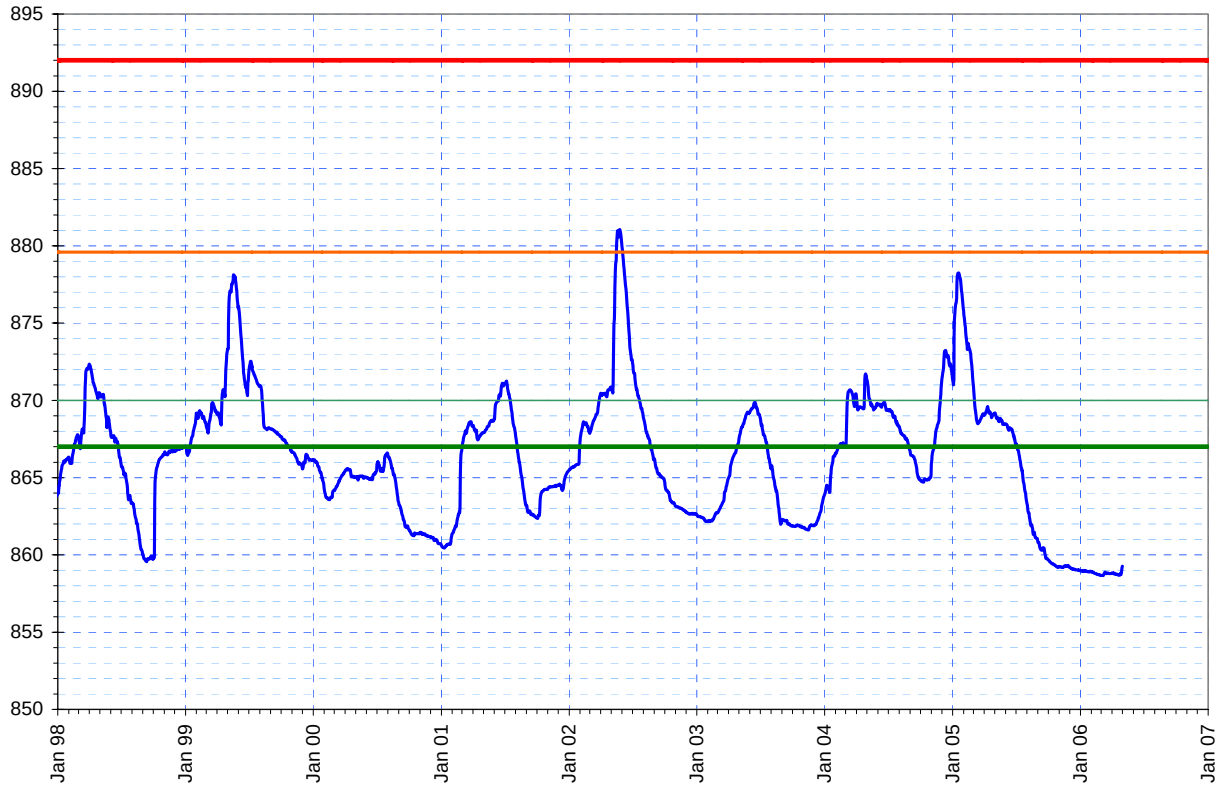


Stockton Lake Historic (Actual) Pool Elevation

Normal Pool = 867.0 Min Phase 2 = 870.0 Min Phase 3 = 879.6 Flood Pool = 892.0



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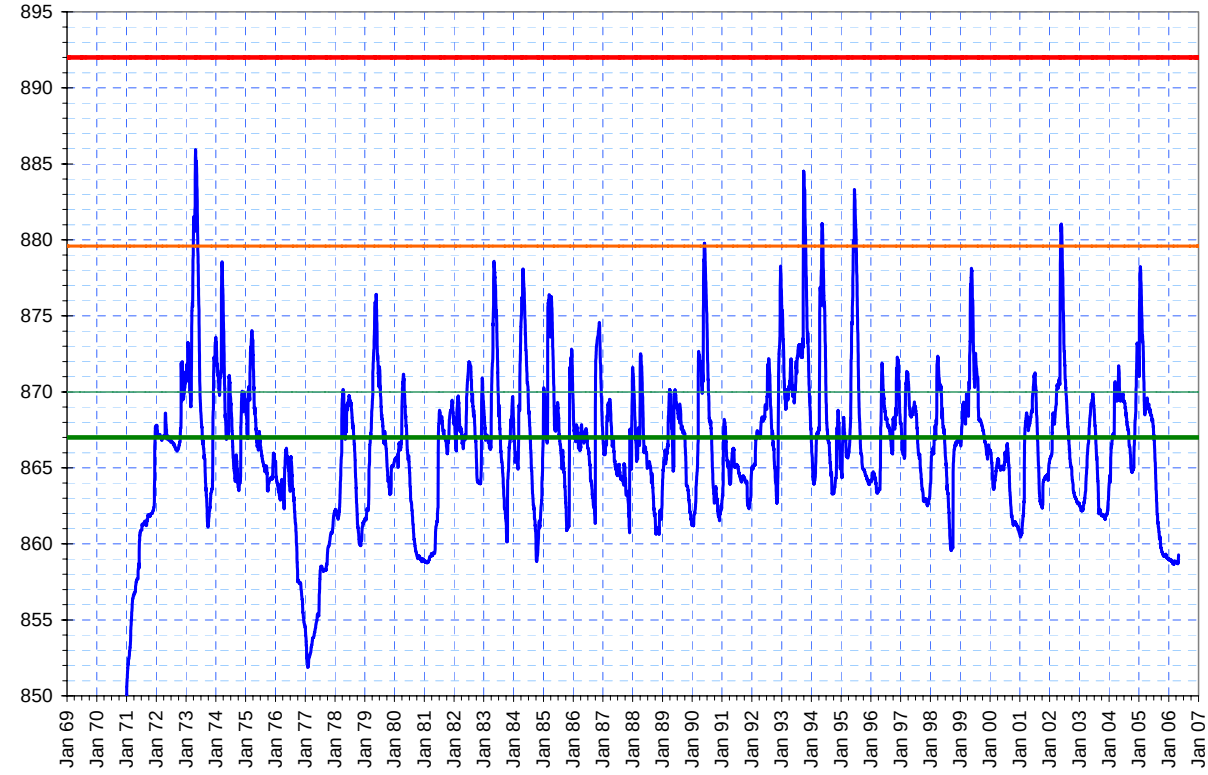

Stan Mason – Southwestern Power Administration
Southwestern Power Administration markets power from 44 projects throughout Texas, Oklahoma, Arkansas and Missouri to consumer owned utilities in those states. We are a pure peaking product where they schedule power for a few hours during the day. By law we are assigned the responsibility to recover some costs of core expense and we do that by charging cost based rates. We do not participate in the market. Customers are limited to the amount of power they can take. SWPA uses 19 projects to support peaking product that we sell. Four projects are in Missouri: Stockton, Truman, Cannon and Table Rock. Table Rock Reservoir near Branson Missouri has markedly improved by +3 1/2 feet. May 4th, 2006 should help Table Rock reservoir gain some additional storage. Southwestern Power Administration reported that their total power loses in the system since July of 2005 amounted to $37.5 million. We have been experiencing drought since last spring and have purchase power in lieu of running power. Our operations center is in Springfield and our hydrologic office is in Tulsa, and we communicate every day. Given the core reduction in downstream requirements customers were told that they did not have to take the minimum, but could take less. Any flow in the Arkansas River takes tremendous pressure off. In 2001 we experienced some drought conditions on the White River, but rains along the way on the Arkansas River helped take off the pressure.

Scott Dummer – National Weather Service
14 day observed precipitation analysis is available on the NWS website. The Thompson River at Trenton, about a year ago was above normal, since July it has fallen below normal and now back up. A couple more decent rain events are needed to increase base flow values. Storage upstream will help this as well. Spring River near Waco had not experienced as many problems with stream flows but since last June started a trend of below normal and has continued to remain low. With recent rainfall it is starting to catch up. The southwest part of the state has been pretty fortunate in the last month, receiving 7 inches of rain. Ralls County remains really dry and west central and southwest Missouri are still 8-12 inches below normal. Northeast Missouri still has some dry patches, with a little in the southeast also.

Short term and extended monthly forecasts indicate that wetter than normal conditions are likely to continue for most of Missouri. Temperatures for May, June and July are forecast to be slightly above normal for the southwest third of the state with normal temperatures for the rest of the state. The Climate Prediction Center's U.S. seasonal drought outlook through July 2006 shows some drought improvement likely for all of Missouri.

Judy Grundler – MO Department of Agriculture
Agricultural impacts have been a mixed bag. Planting of most crops are ahead of schedule with dry conditions for land preparation. Corn planted is at 90% and beans had a good start, with rice dramatically ahead of schedule. Cotton is not quite as early as some other crops. Hail damage was seen melons and corn in the SE part of the state. Also in the bootheel some producers were waiting for rain before planting. Wheat progress in southwest Missouri is not doing well for it has matured rapidly with the extreme dry conditions. In other parts of the state wheat seems to be doing pretty well. Some wheat fields in SE were being irrigated. There is some disease pressure and same aphid problems reported in the drought stressed regions of the state. There is an increase in insect development because of the milder winter and warm temperatures. Alfalfa weevil and bean leaf beetles have been reported as problems in some areas. There have been reports of high trap captures of armyworms and black cutworms but no reports of damage at this time. Armyworms are a concern in particularly in pastures which are already drought stressed. Pastures have not recovered from previous dry conditions. Poor pasture conditions in the state lead to poor hay storage also because of increase feeding of hay. The hay yield last year was not good and livestock market reports say that hay was being fed to livestock up until last week. Hay and pasture conditions can

improve and recover with the past rains, but has already been impacted by what happened early in the season. Some alfalfa hay has been cut, but low yields are reported.

Gene Danekas – USDA
Corn is in pretty good shape and soybeans are going in. Less than half the pastures are considered good. Water supply is probably a bigger concern that pastures. Watering supply for livestock is needed.

Sarah Fast - DNR
Soil and Water District do have money for reseeding. There is additional money available, but it has not yet been requested.

Deana Cash - DNR
No emergency situations due to drought at this time.

Missouri American Water, Joplin's water utility, is closely monitoring the level of its primary source of water, Shoal Creek. Shoal Creek reached the lowest level it's been in 65 years. The dam of the water supply impoundment on Shoal Creek is equipped with the ability to place slats along the top of the dam to increase storage capacity when the creek is low. On April 18th, Kids tampered with the wooden slats and the impoundment released an estimated 68 million gallons of water.

Springfield is implementing voluntary water conservation measures to reduce usage by 10 percent. They lost the last of three pumps on Stockton Lake due to mechanical and electrical problems. Stockton Lake is low and two other lakes that serve as the city's main reservoirs, McDaniel and Fellows, are at about 70 percent of normal storage.

Lamar has the ability to supplement their reservoir by pumping from wells. Lamar is currently pumping water into their reservoir to help increase the water level in the reservoir.

Bowling Green, located in Pike County, has two water supply reservoirs that are approximately 14 feet down. They have not implemented water conservation measures.

Groundwater supplies in the Southwest portion of the state are noticing lowering groundwater levels. Monett, which is between Joplin and Springfield, moved their pumps down by 100 feet in the last 6 months to capture more available water .

All groundwater supplies are encouraged to measure water levels and drawdown levels in their wells to avoid burning up pumps and being without water. Hot temperatures will increase water demands and groundwater systems in Southwest Missouri may experience problems this summer due to the lowering groundwater levels.

All surface water supplies that have the ability to supplement the water level in their reservoirs by pumping from rivers or wells are encouraged to pump when possible to maintain a full level in their reservoir(s).

Shane Barks – USGS
There are a number of sites for looking at all time lows for last month. Monitoring well network is also available on the USGS website.

Pat Guinan – UMC
I think we have turned the corner. We experienced the worst around the 3rd week of April. We have seen significant changes over the last week. Significant precipitation over the next two weeks is

predicted for southwest Missouri counties. Things are looking much better than about two weeks ago.

Joe Engeln– DNR
The drought started last year mainly in northeast Missouri and started to develop in southwest Missouri with some periodic relief in northeast Missouri. This part of the state has also been slighted in some of the previous rains. Ralls and Pike counties have been between Phases 1 and 2 over the last year. Southeast Missouri has not been experiencing drought conditions, except for in the bootheel, with the southern most tip probably being the worst.

On May 2nd the Climate and Weather Subcommittee met and described 17 counties in south central Missouri as having no drought, 32 counties in Phase 1 – advisory phase, 51 counties as phase 2 – drought alert, and 14 counties as phase 3 – conservation phase. At today's meeting the Committee upgraded St. Charles, St. Louis, Chariton, Randolph and Howard counties to Phase 1 from Phase 2. These upgrades were needed due to recent 2 inch rainfall totals. The map is made to provide awareness of the conditions statewide, focusing primarily on hydrologic drought conditions.

Phase 1 counties (37): Andrew, Atchison, Buchanan, Caldwell, Carroll, Chariton, Clay, Clinton, Cole, DeKalb, Dunklin, Franklin, Gasconade, Holt, Howard, Howell, Jefferson, Maries, Miller, Mississippi, Moniteau, New Madrid, Nodaway, Osage, Pemiscot, Phelps, Platte, Pulaski, Randolph, Ray, Scott, St. Charles, St. Louis, Stoddard, Texas, Warren and Worth.

Phase 2 counties (46): Adair, Audrain, Benton, Boone, Callaway, Camden, Cass, Clark, Cooper, Dallas, Daviess, Douglas, Gentry, Greene, Grundy, Harrison, Henry, Hickory, Jackson, Johnson, Knox, Laclede,
Lafayette, Lewis, Lincoln, Linn, Livingston, Marion, Macon, Mercer, Monroe, Montgomery, Morgan Ozark, Pettis, Pike, Polk, Putnam, Ralls, Saline, Schuyler, Scotland, Shelby, Sullivan, Webster and Wright.

Phase 3 counties (14): Barry, Barton, Bates, Cedar, Christian, Dade, Jasper, Lawrence, McDonald, Newton St. Clair, Stone, Taney and Vernon.

No drought counties (17) Bollinger, Butler, Cape Girardeau, Carter, Crawford, Dent, Dunklin, Iron, Madison, Mississippi, New Madrid, Oregon, Pemiscot, Perry, Reynolds, Ripley, Scott, Shannon, Stoddard, St. Francois, Ste. Genevieve, Washington and Wayne.

Overall the State's drought status is much better than its worst during the 3rd week in April. However, since most of the severe impacted areas in southwest, central and north Missouri have had protracted, about 12 months of below average precipitation, and subsoil moisture and groundwater levels are still low, the DAC determined that caution is warranted.

The Climate and Weather Committee will meet again in the next couple of weeks to look at conditions and reassess the interim drought status map.

DNR will share today's information with the Governor's office and also put out a news release to provide this information to the public.

Meeting adjourned.